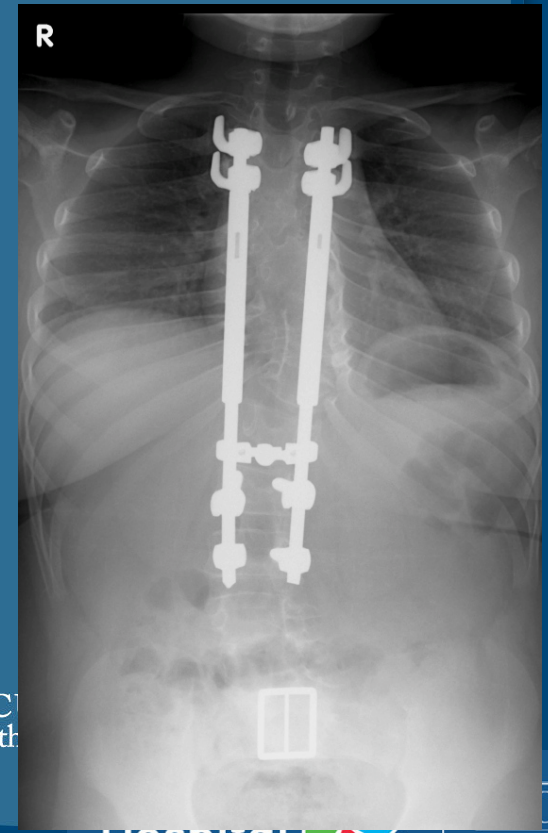
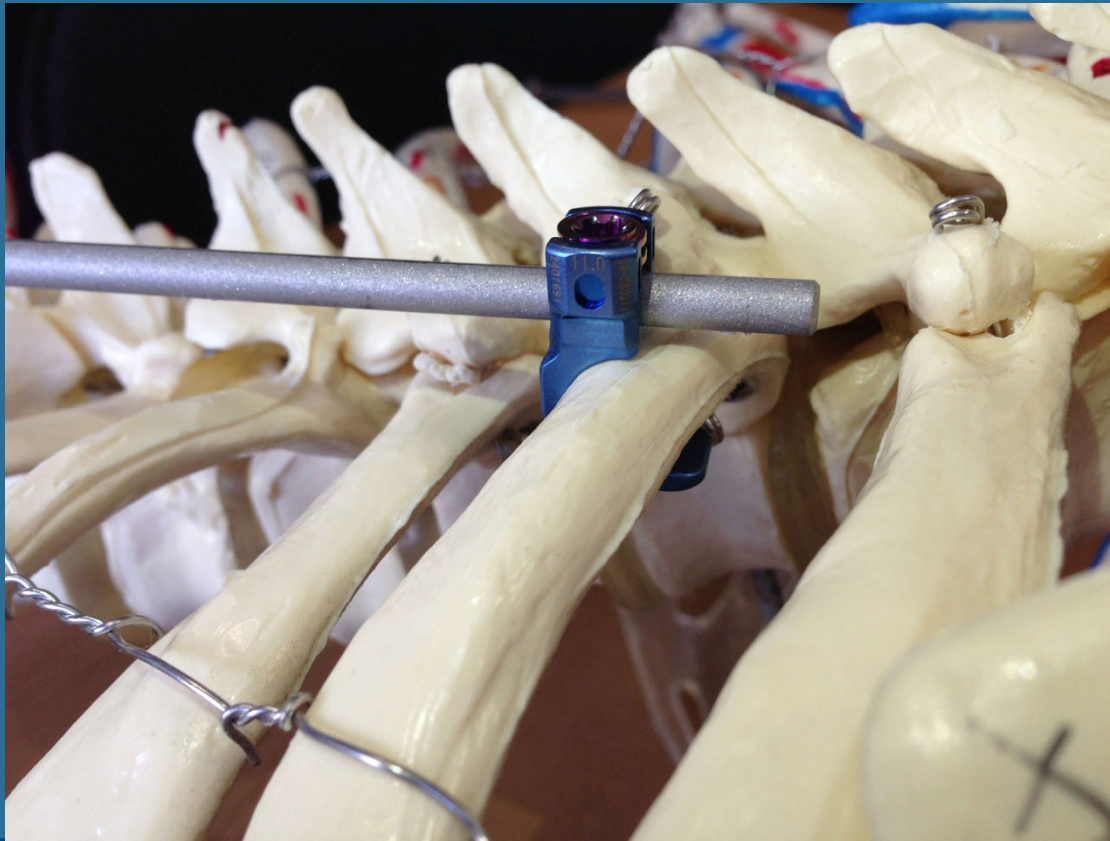
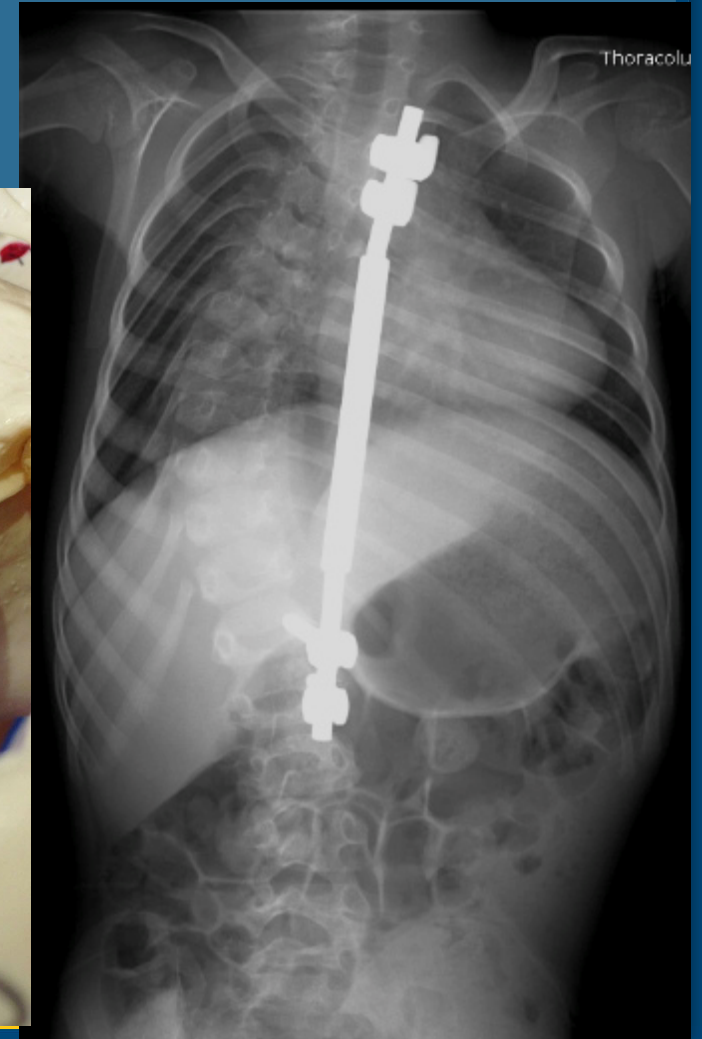
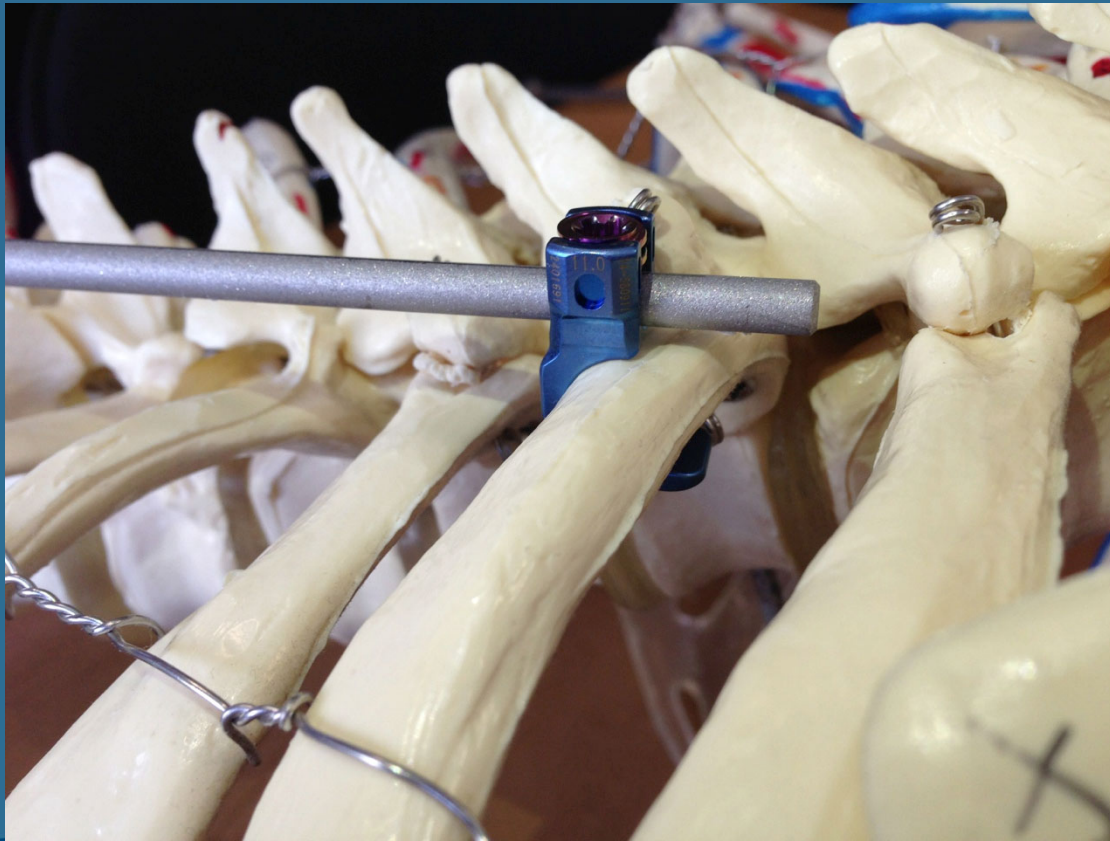


Masters Techniques: Rib Anchored Distraction Based Growing Rods

David L. Skaggs, MD
Professor and Chief
Children's Hospital Los Angeles
University of Southern California



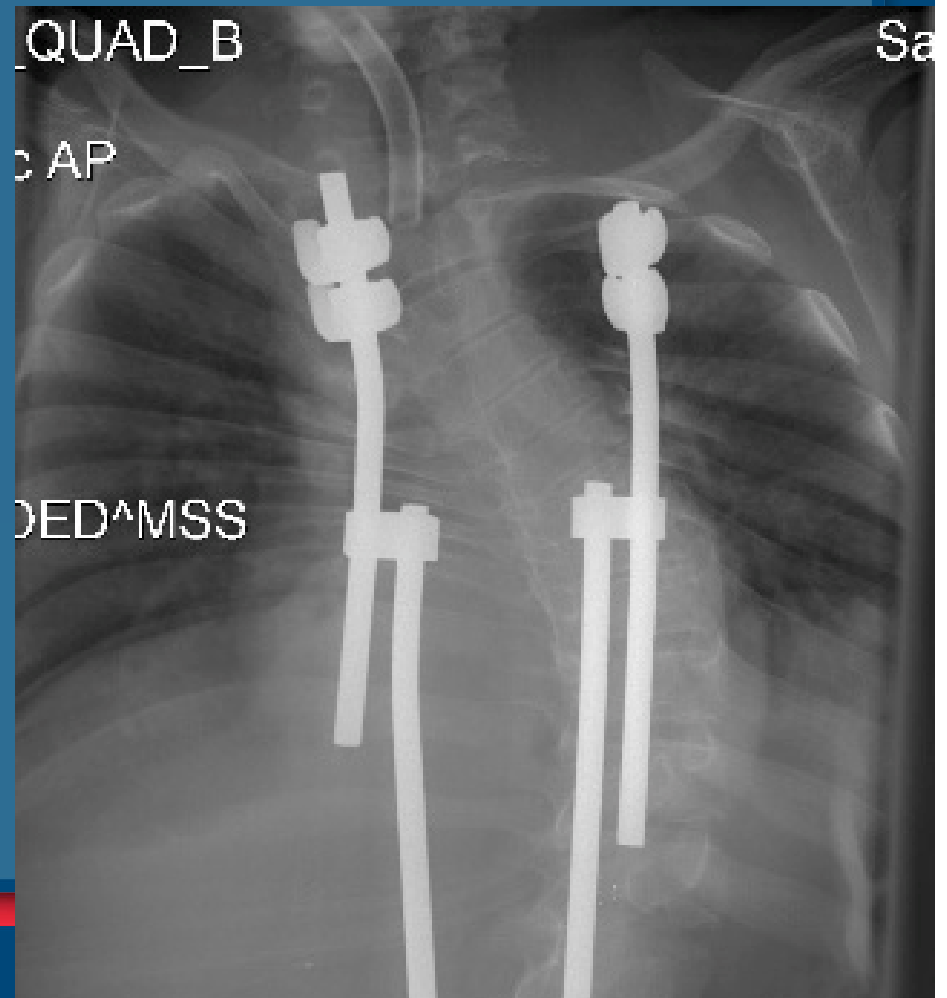
Use of Spine Hooks on Ribs NOT FDA Approved



Part 1: Theoretical Advantages



Hooks on Ribs: No intentional fusion
Do not expose or fuse upper spine
No thorocotomy!

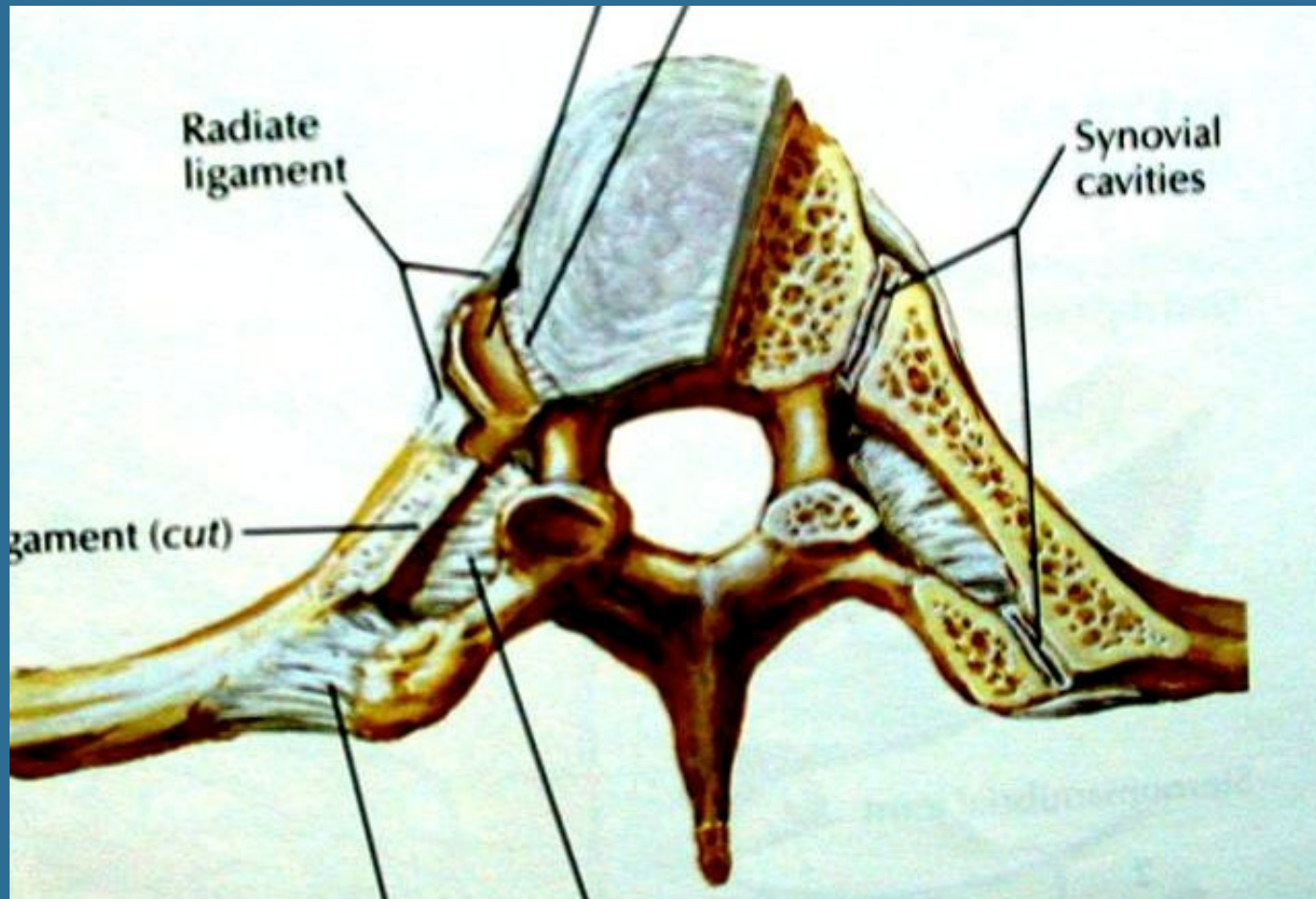


Traditional Growing Rods Cause Autofusion

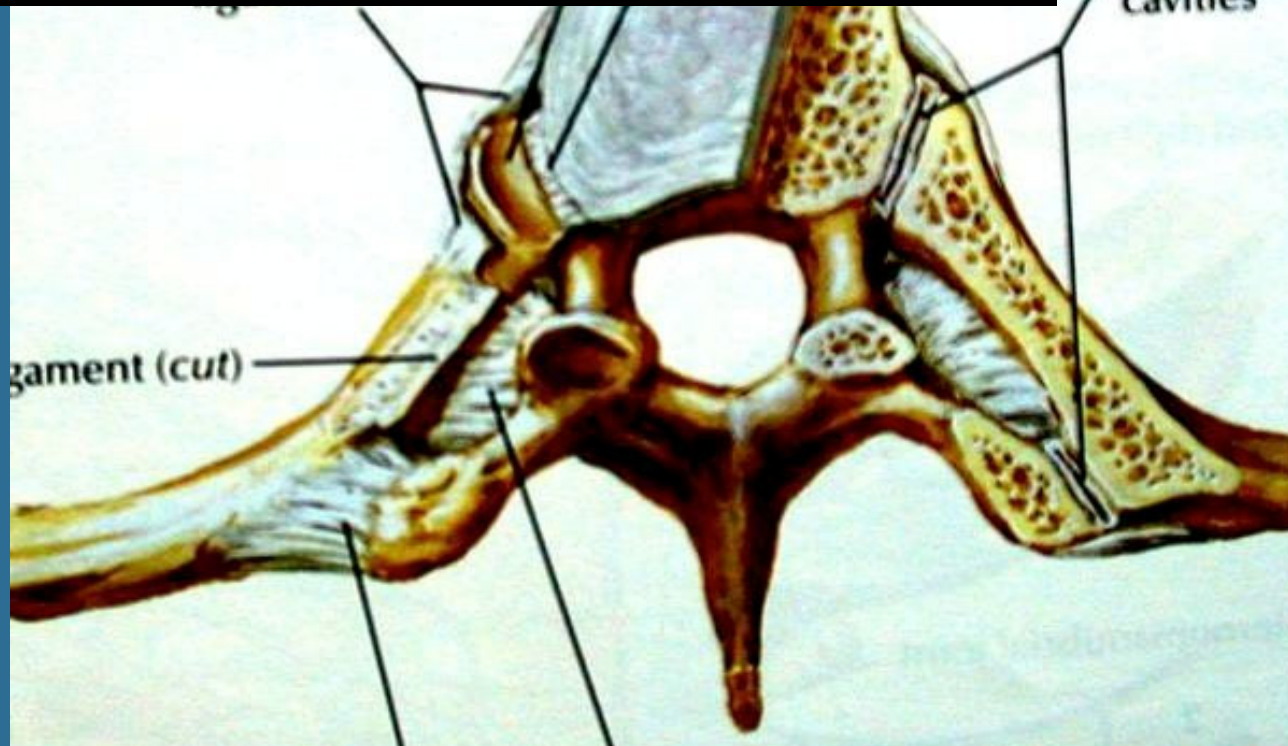
Cahil, et. Al, Spine 2010

- 8/9 patients autofused - Stiff Curves!
- Growing rods in for 7 yrs
- Mean of 7 osteotomies done at final fusion
- 44% Cobb Angle correction

Motion - Slower to autofuse???



“give” of the ribs
“slop” of the hooks
Less likely to break rods?



“give” of the ribs
“slop” of the hooks
Less likely to break rods?

Synovial
cavities

GSSG Study – 176 pts, 56 month f/u
rib anchored growing rods 77%
less likely to break rods than
spine anchored



Are Rib Vs. Spine Anchors Protective Against Breakage of Growing Rods?

Yamaguchi, Skaggs,, Mansour, Myung, Yazici, Johnston, Thompson, Sponseller, Akbarnia, Vitale, Growing Spine Study Group, Spinal Deformity, 2014

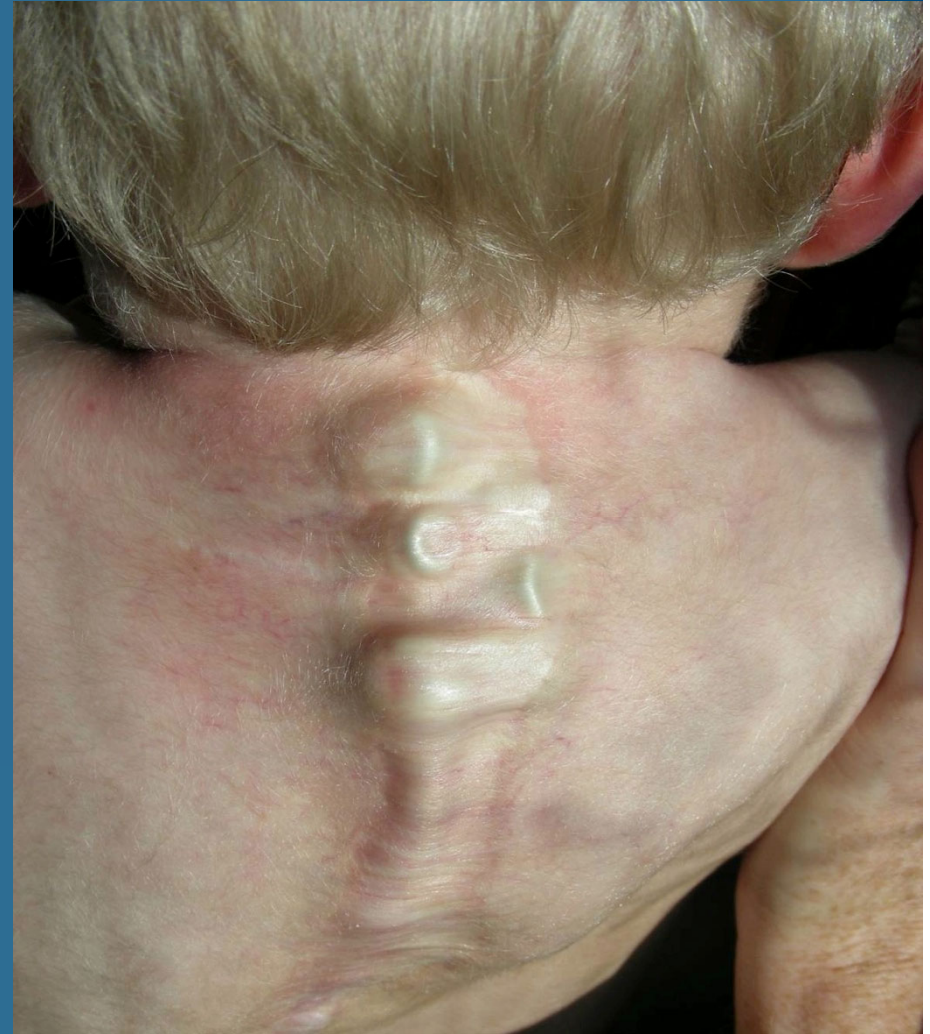
	Patients	Rod Breakage	Anchor complication
Rib Anchored	34	6%	38%
Spine Anchored	142	29%	33%
		P=0.04	P=0.12

Rods broke 4X more with spine anchors than rib anchors

*Size of Cobb angle most significant ($p=0.01$)

Nutritionally Depleted Population

- Soft tissue Coverage Challenging
- 47% pts pre-op failure to thrive (<5 percentile)

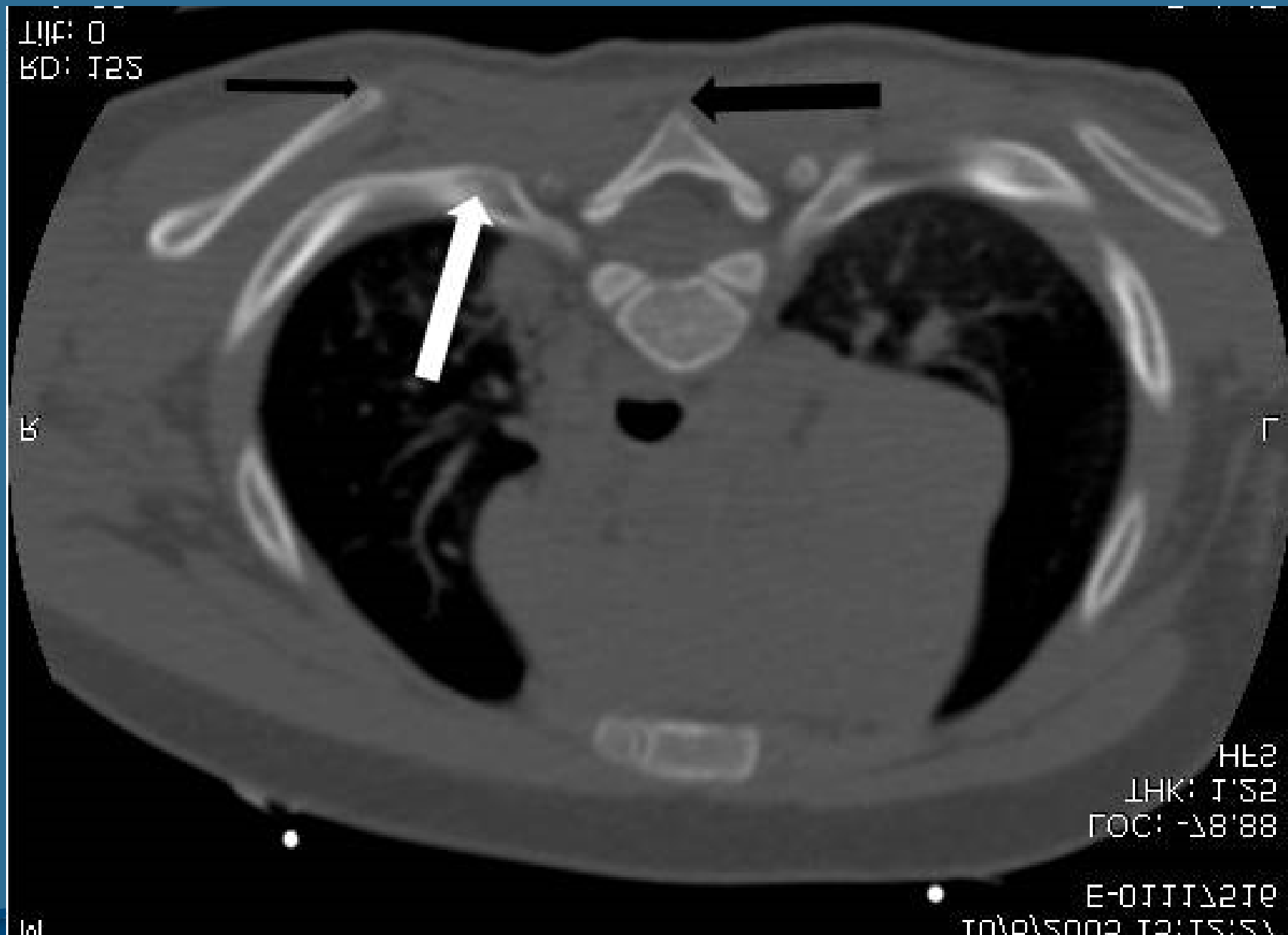


Myung, 2009

Southern California

LOS ANGELES
CHILDREN'S
ORTHOPAEDIC CENTER

Low Profile

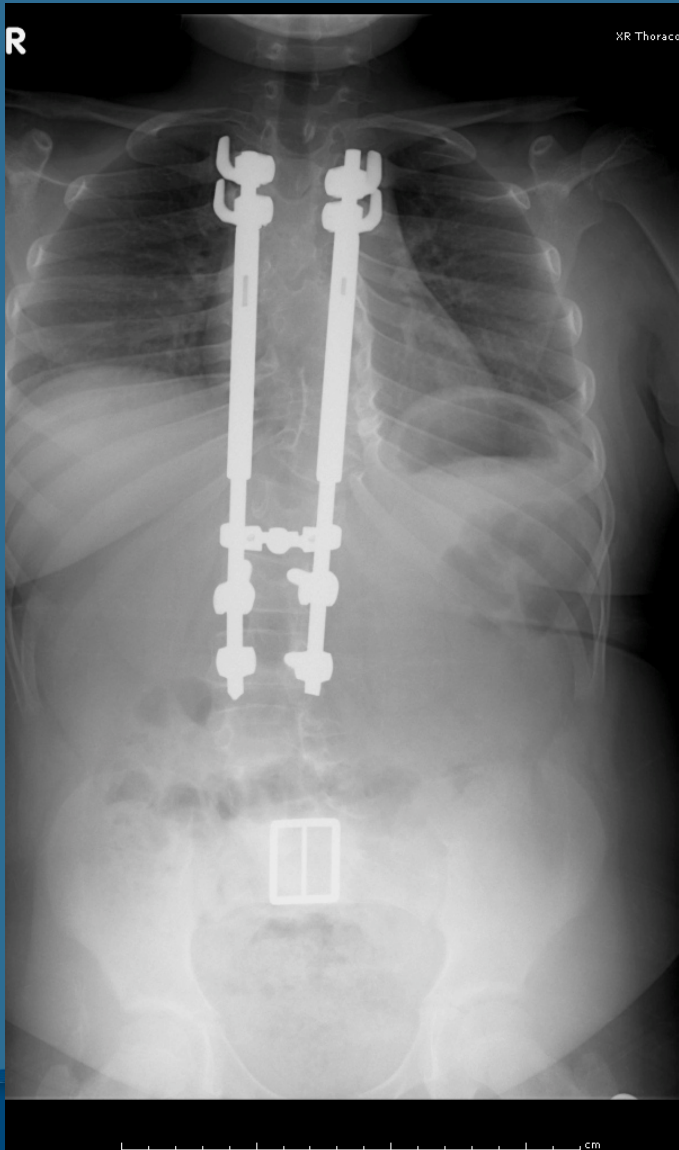


Rib based anchors better for PJK?

- Hybrids 42% (5/12) Vs. Growing rods 62% (10/17)
 - $P=0.059$

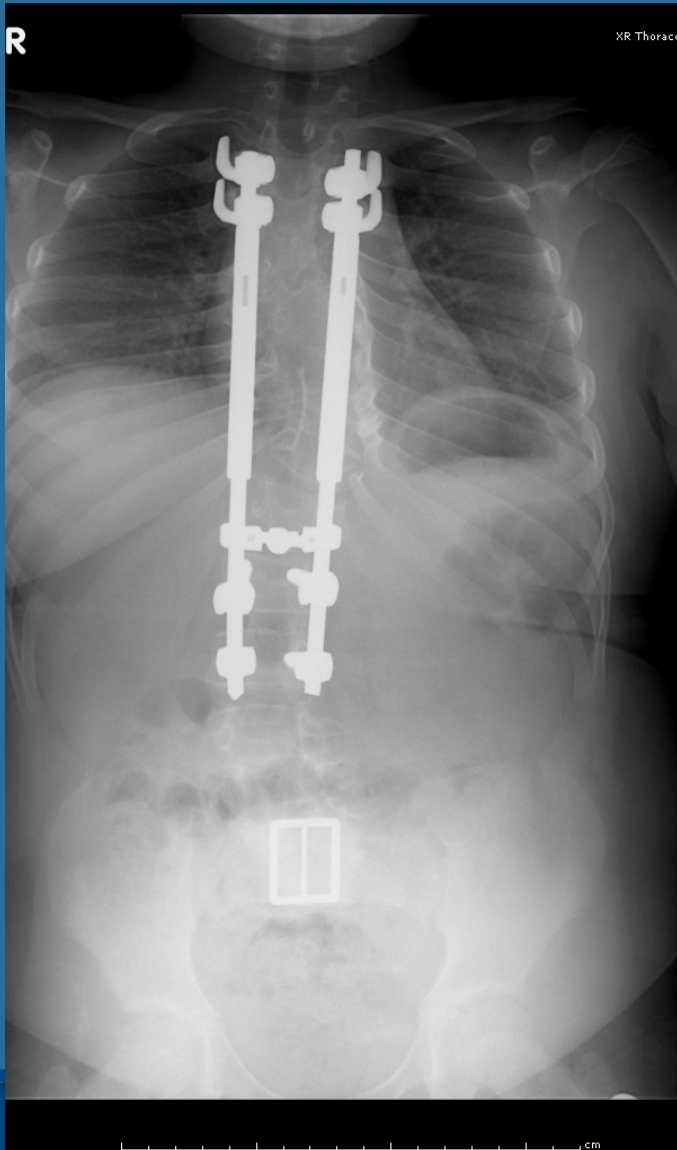
Lee, et al, PJK in Distraction-Based Growing Rods, SRS, 2011

Advantages of rib anchors



- Avoid proximal fusion
- Less rigid system
 - Minimize autofusion?
 - Less rod breakage
- Lower Profile
- Less PJK?

Advantages of rib anchors



- Avoid proximal fusion
- Less rigid system
 - Minimize autofusion?
 - Less rod breakage
- Lower Profile
- Less PJK?

Possible Disadvantage
– Does it hurt
pulmonary function?

Why use “spine hooks” instead of VEPTR

- Already in hospital
 - Staff familiar
 - Minimize inventory
 - I am more familiar with systems I use daily
- No IRB approval needed
- Less expensive
- Easy to adjust sagittal contour and hook placement

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My opinion
Clinical Equipose Between
“spine hooks” and VEPTR

Part 2: Technique

- Disclosure - Technique is pretty straightforward
- Few Problems

Midline Incision - Plan for final fusion



Midline Incision - Plan for final fusion

- No Dissection of Proximal Spine
- Feel bump of transverse process
- Split muscles just lateral to TP

Adjacent to TP



Adjacent to TP

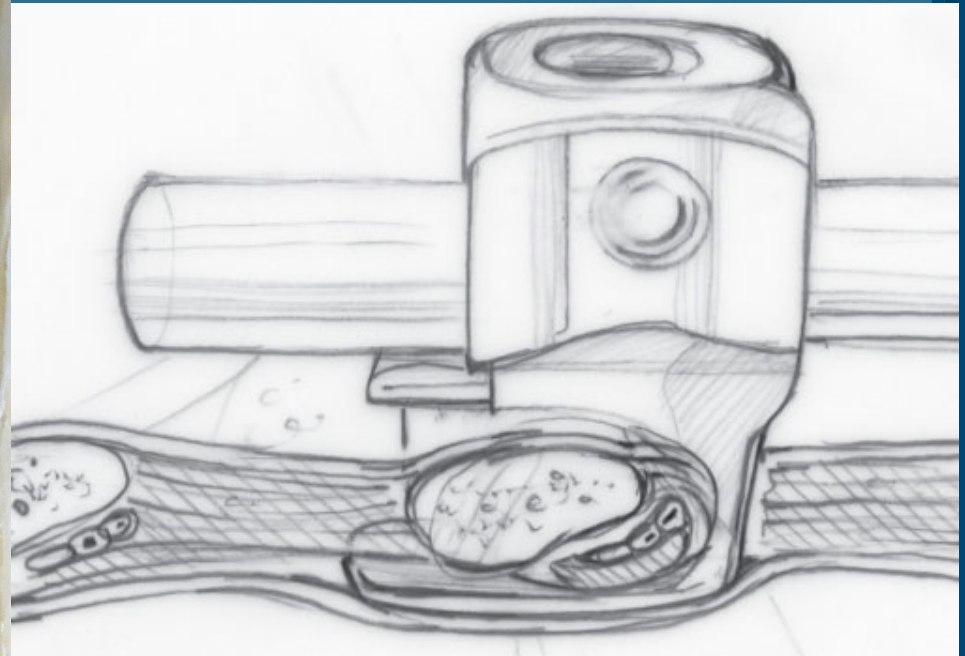


Extra-Periosteal

Want ribs to hypertrophy

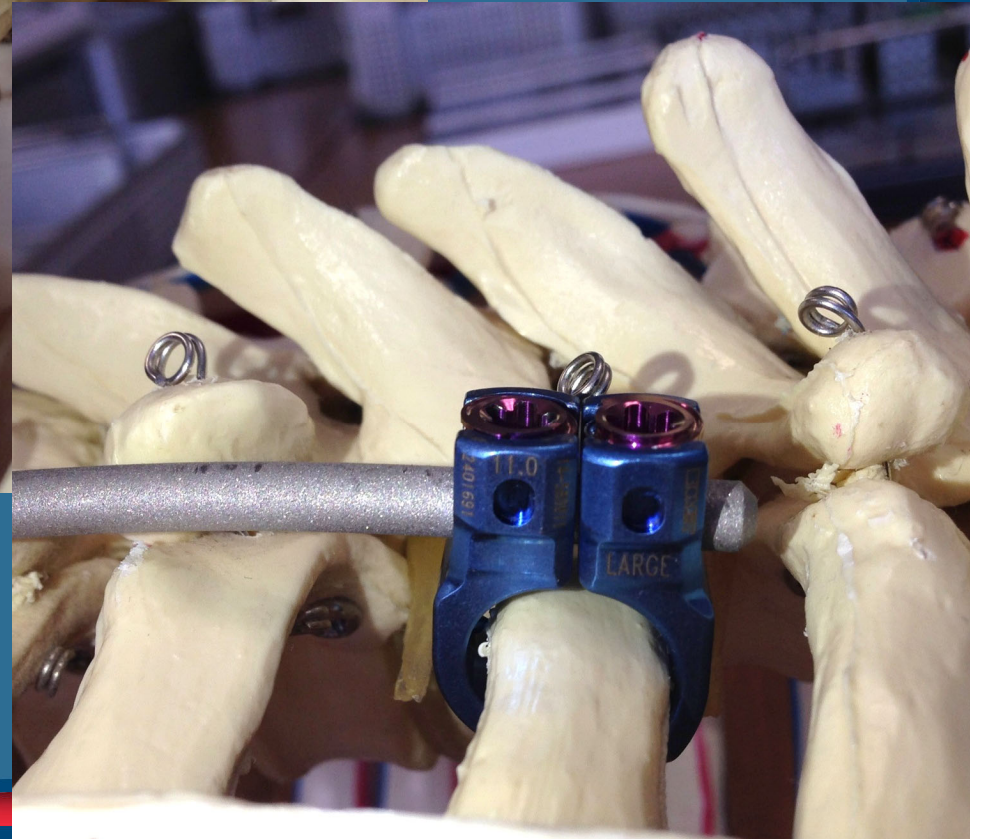
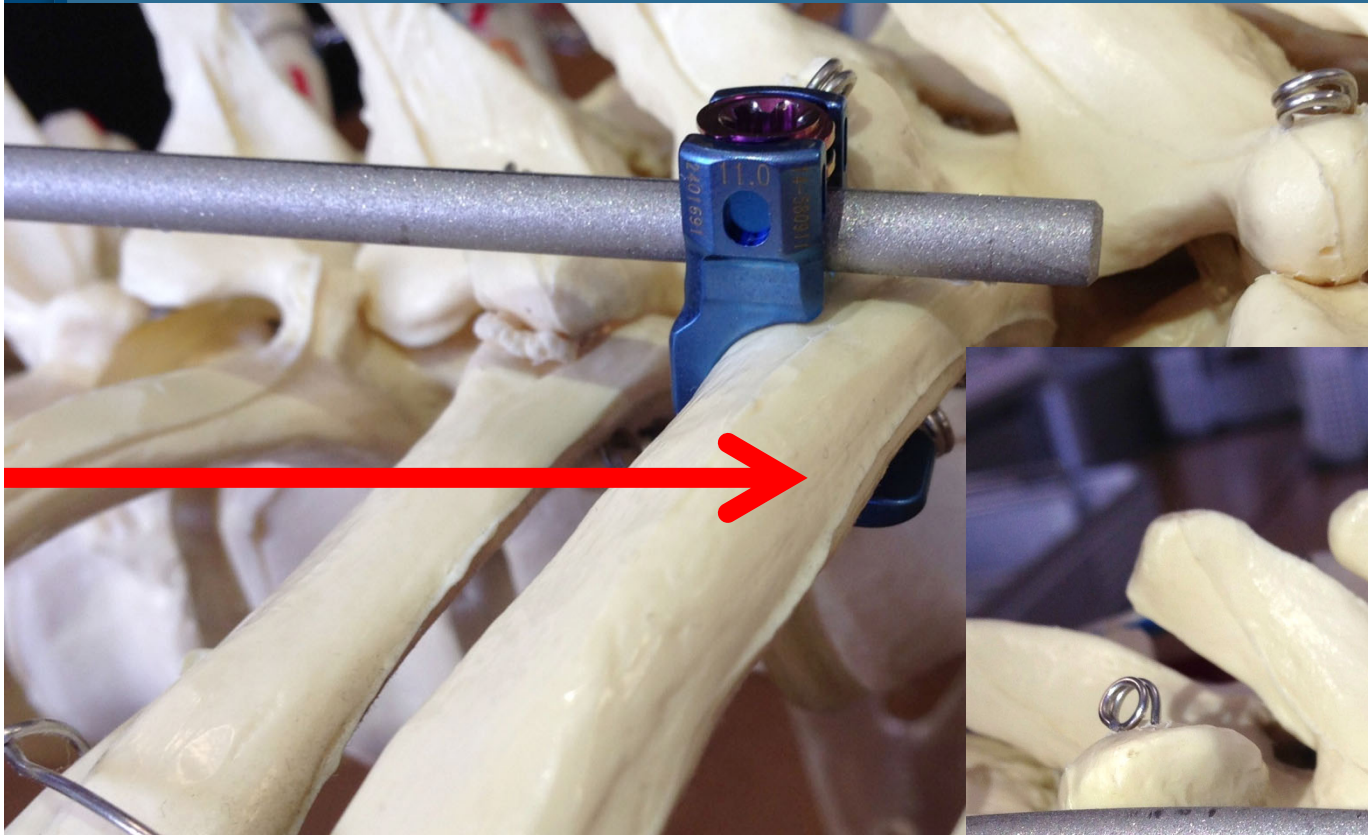
NOT in chest

No chest tube



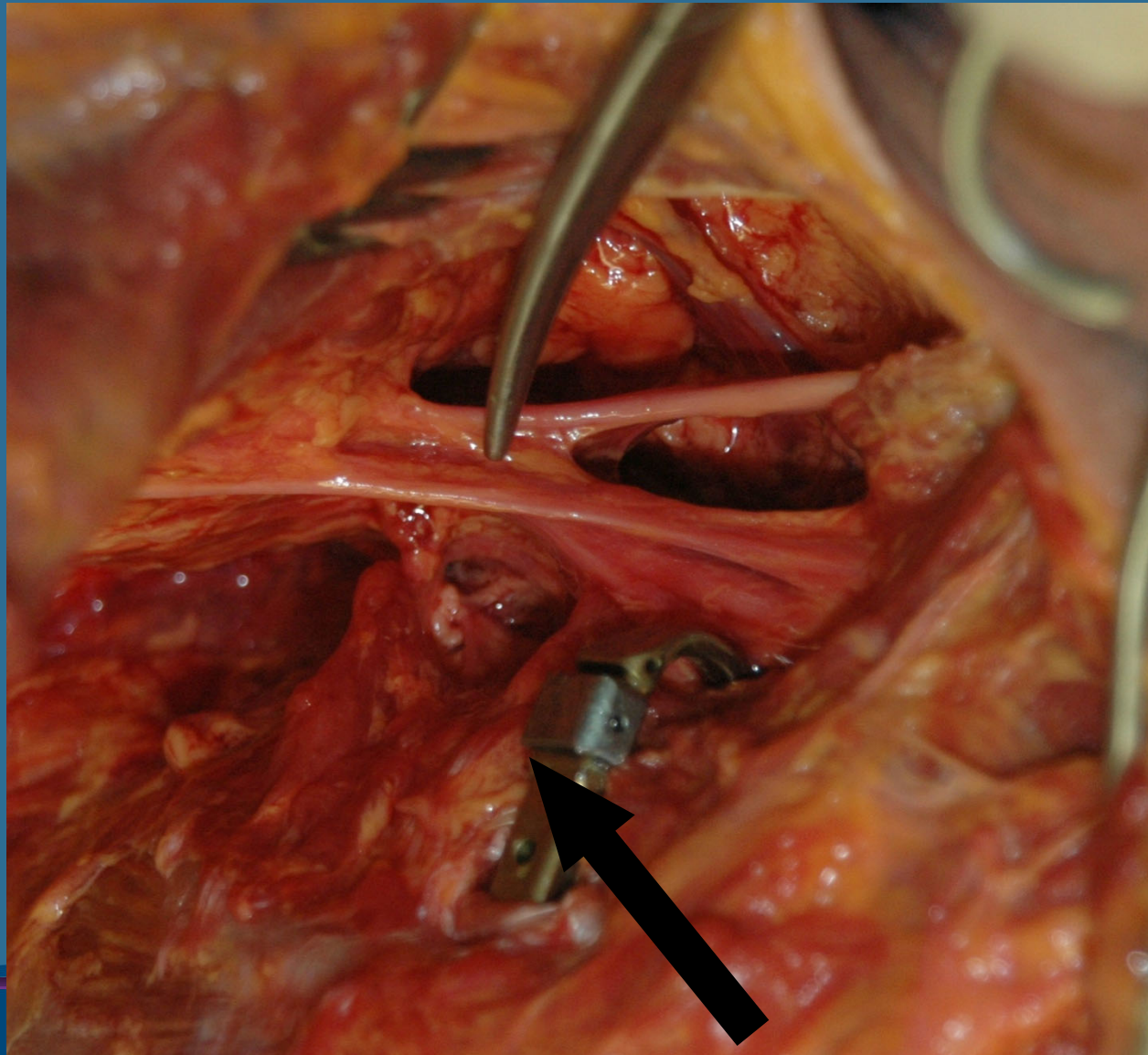
ORTHOPAEDIC CENTER

No Advantage to “Claw”

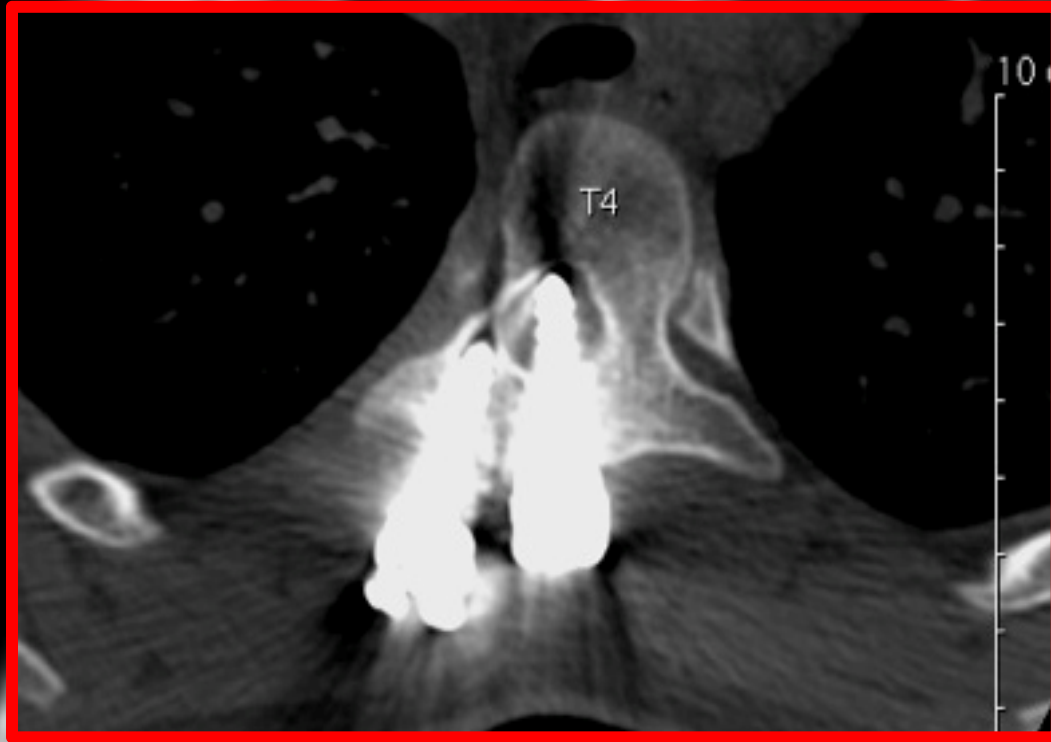




Don't use first rib



Fails Posterior



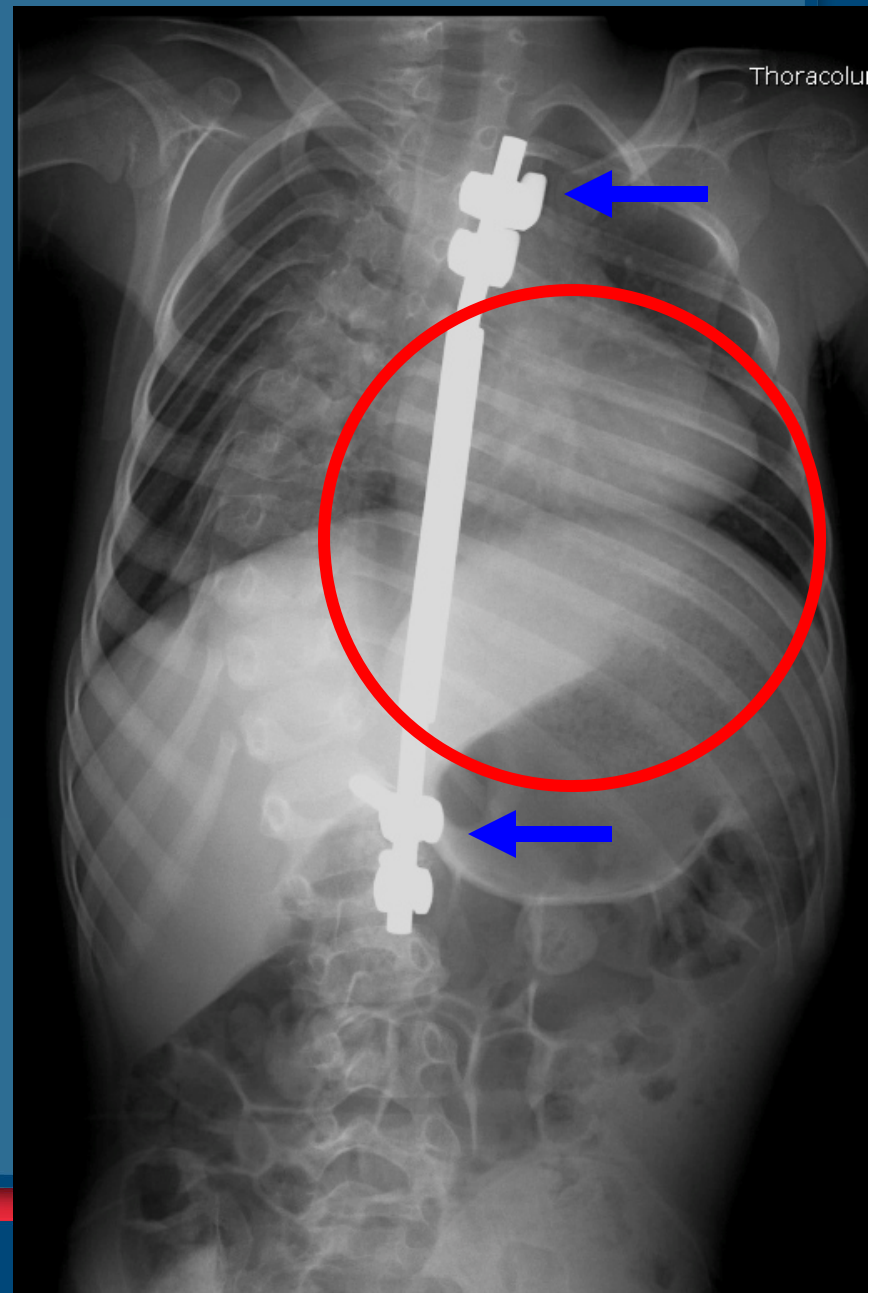
©Behrang Amini, MD/PhD

Case Example 5yo boy

- Ambulatory
- neuromuscular
- 91° Scoliosis -progressive
- Extremely thin



Portable Traction



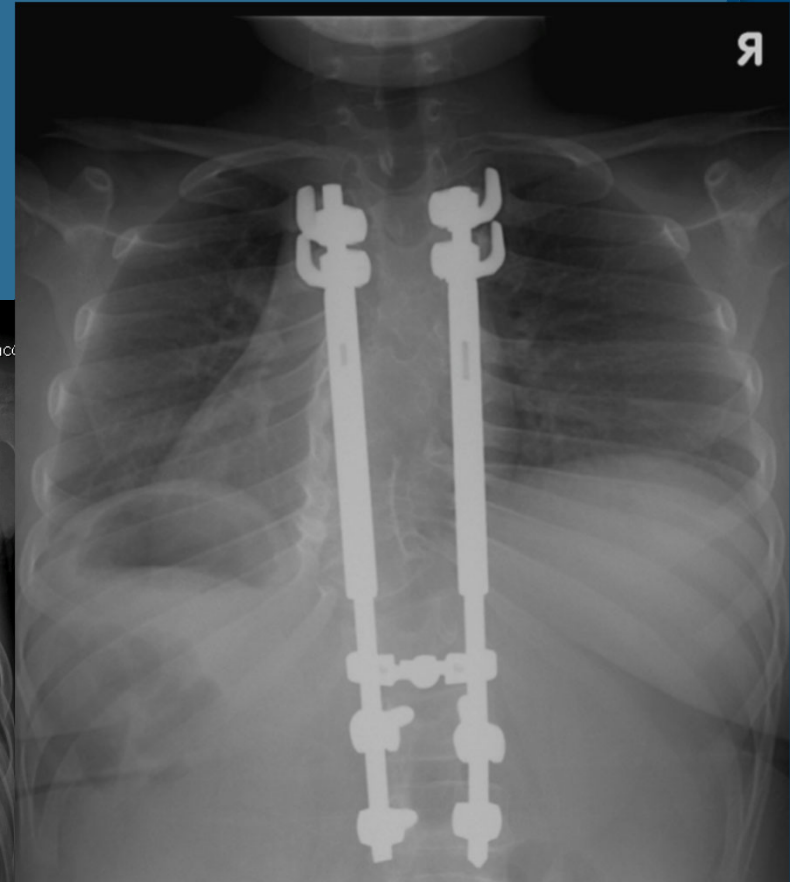
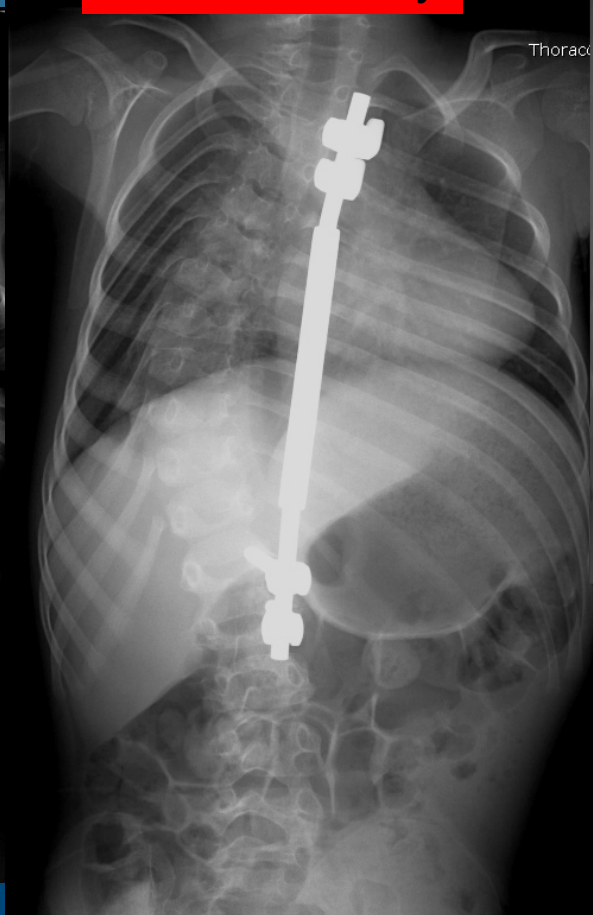
Current Preference

- Dual-sided constructs
- ≥ 3 up-going hooks

REALLY thin kids



NO Thorcotomy



USC University of
Southern California



CHILDREN'S
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Thank You



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